REMARKS/ARGUMENTS

In respond to the objection of the specification and drawing, Applicant has amended the title, abstract and FIG. 5A in respond to the detailed action.

Reconsideration of the application is respectfully requested for the following reasons:

Rejection of Claims 26-50 Under 35 U.S.C. §112, second paragraph

In respond to the rejections of claims 26, 35, 36 and 37, Applicant has amended claims 26, 35, 36 and 37 according to the specification originally filed without involving any issue of new matter. Reconsideration of claims 26, 35, 36 and 37 is respectfully requested.

Rejection of Claims 26, 33-37 and 40-42 Under 35 U.S.C. §102(b)

Claims 26, 33-37 and 40-42 are rejected under 35 U.S.C. §102 (b) as being anticipated by Applicant's disclosure. In the rejected claims, only Claim 26 is independent.

Examiner states that the conventional cleaning method of the background of the claimed invention uses the steps as claimed with the exception of the immersion time, a first time, second time, second immersion time, and third time which means the times as claimed in claim 26 is inherent in the conventional method disclosed at pages 2 and 3 and in Fig. 3.

However, in the background of the claimed invention, several drawbacks of the conventional method are also pointed out. As shown in FIG. 2 of the claimed invention, after the clean steps are completed, metal corrosion would occur on the sidewalls of the metal lines 102. There is a large quantity of recesses occurring on the sidewalls of the metal lines 102, which look like mouse bites. The metal corrosion does not influence the device yield, but reduces reliability of the devices. Moreover, the defect count of the wafer on KLA map is very large, which shields other defects related to the device yield. As a result, the other defects can be not found out at on-line monitoring.

The mechanism of removing polymer residues on the sidewalls of the metal lines with the stripping solution is the stripping solution attacks aluminum or its oxide to remove polymer residues from the sidewalls of the aluminum metal lines, and then dissolving the removed polymer residues in the stripping solution. When there is excess water in the stripping solution Metal corrosion would occur on the sidewalls of the metal lines 102, as shown in FIG. 2. FIG. 4 is a diagram

of aluminum etching rate versus water content of the stripping solution when using the stripping solution containing alcohol amine, dihydroxylbenzene, water, hydroxylamine and anticorrosion agent to clean aluminum alloy. As shown in FIG. 4, when water content is below 60 wt.%, aluminum etching rate is smaller than 0.1Å/min, while water content is up to 98 wt.%, aluminum etching rate is up to 58 Å/min. It is apparent that a little of the stripping solution in a large quantity of water would result in serious metal corrosion on aluminum alloy. Therefore, the stripping solution left on the wafer needs to be completely removed before immersing the wafer in the overflow bath 322 so as to avoid metal corrosion occurring on the sidewalls of the metal lines 102 formed on the wafer.

Accordingly, the claimed invention provides an improved clean method to overcome the drawbacks of the prior art. As to the immersion time, a first time, second time, second immersion time, and third time in the claim actually can provide unexpected results and is not inherent in the conventional method disclosed at pages 2 and 3 and in Fig. 3 because the time the wafer is maintained without contacting the stripping solution after being removed from the stripping solution is for dripping down the stripping solution left on the wafer. Generally, a conventional clean method would not specifically remove the stripping solution remained on the wafer taking from the stripping solution before immersing in a large quantity of water in view of production cost and the remaining stripping solution in a large quantity of water would result in serious metal corrosion on

sidewall of metal lines such as aluminum alloy lines. Applicant emphasizes that the times as claimed in claim 26 is not inherent in the conventional method since the additional time for placing the wafer over the stripping solution without contacting the stripping solution is to drip down the stripping solution left on the wafer before immersing into water to prevent serious metal corrosion on sidewall of metal lines. For example, the wafer would not be particularly maintained without contacting the first organic solvent bath after being removed from the first organic solvent bath and before being immersed into the second organic solvent bath in the conventional method in order to increase production capability and to prevent the residual chemical mark. In the conventional method, the wafer is always immediately immersed into the second organic solvent bath after being removed from the first organic solvent bath in less than 10 seconds so that the stripping solution remained on the wafer would be also immersed into the overflow bath to cause serious metal corrosion of metal lines.

Thus the times as claimed in claim 26 to drip down the stripping solution left on the wafer can produce unexpected results contrary to the conventional method.

Rejection of Claims 26, 33-36 Under 35 U.S.C. §102(a)

Claims 26, 33-36 are rejected under 35 U.S.C. §102 (a) as being anticipated by Lee (U.S. 6,276,372). In the rejected claims, only Claim 26 is independent.

Examiner uses the same reason which states that the times as claimed in claim 26 is inherent in the method disclosed by Lee. Lee actually discloses a process for removing photoresist residue or other polymeric material from a substrate with a specific cleaning composition as described in the detailed action. The method of Lee actually discloses a method almost the same with any other conventional method except the specific cleaning composition. The times as claimed in claim 26 actually is not inherent in the method of Lee either since the additional time for maintaining the wafer without contacting the stripping solution is to drip down the stripping solution left on the wafer before immersing into water to prevent serious metal corrosion on sidewall of metal lines. Lee dose not disclose this particular limitation which can produce unexpected results or prevent serious metal corrosion on sidewall of metal lines.

Rejections of Claims 27-32 and 37-50 Under 35 U.S.C. §103(a)

Claims 43-50 are rejected under 35 U.S.C. §103 (a) as being unpatentable over Applicant's disclosure in combination with Torek (US 6,562,726 or US 6,453,914).

Although Torek discloses introducing agitating gas into a rinse bath but Torek dose not teach introducing agitating gas into a clean method of the claimed invention which Applicant's disclosure fails to disclose either.

Claims 27-32 and 37-50 are rejected under 35 U.S.C. §103 (a) as being unpatentable over Lee in combination with Torek (US 6,453,914).

The reason of the obviousness rejection based on the combination of Lee and Torek is actually the same with the rejection based on the combination of Applicant's disclosure and Torek. Applicant respectfully disagrees with Examiner's opinion which states that it is obvious for one skilled in the art to repeat the rinsing step, to adjust the stripping time and the rinsing time to obtain optimum result since the limitation in the claimed invention can produce unexpected result. Although the stripping time and the rinsing time are determined based on particular material being removed, but the time of

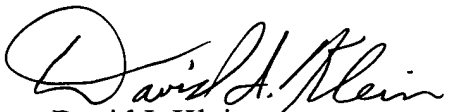
maintaining the wafer without contacting the stripping solution is determined based on the stripping solution left on the wafer before immersing into water in the claimed invention.

Conclusion

In light of the above remarks to the claims, Applicant contends that claimed invention is patentable thereover. Claims 26-50 are now in condition for favorable consideration and allowance of Claims 26-50 are most respectfully requested.

This Amendment was prepared by Applicant, and is being submitted without substantive change by the undersigned Attorney.

Respectfully submitted,



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